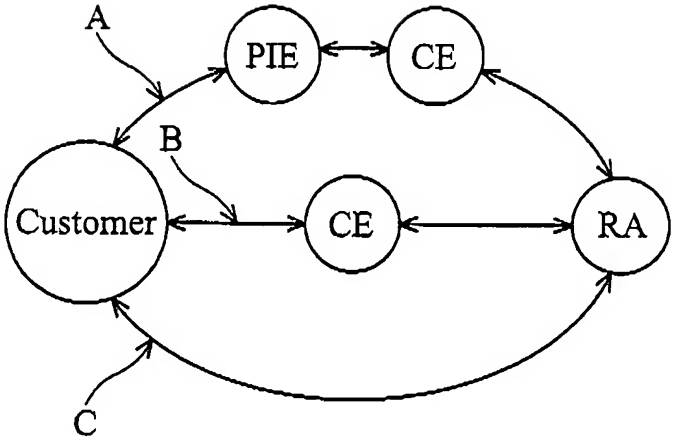


FIG. 1 (RELATED ART)

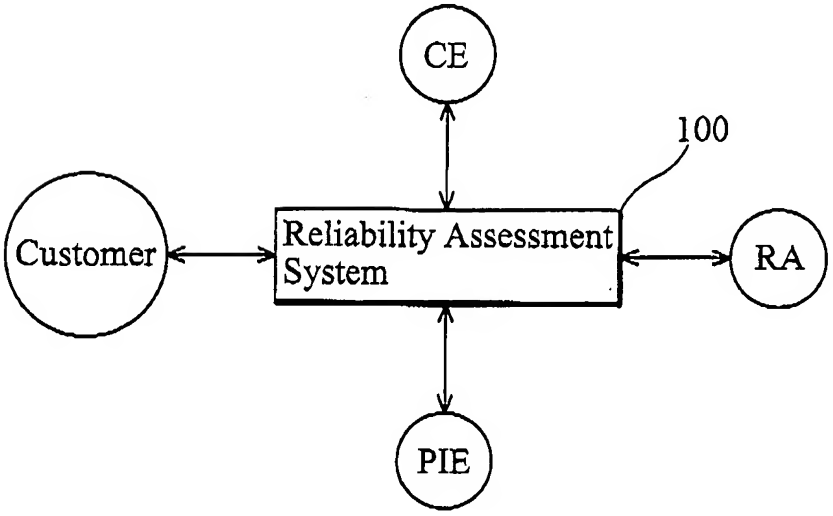


FIG. 2

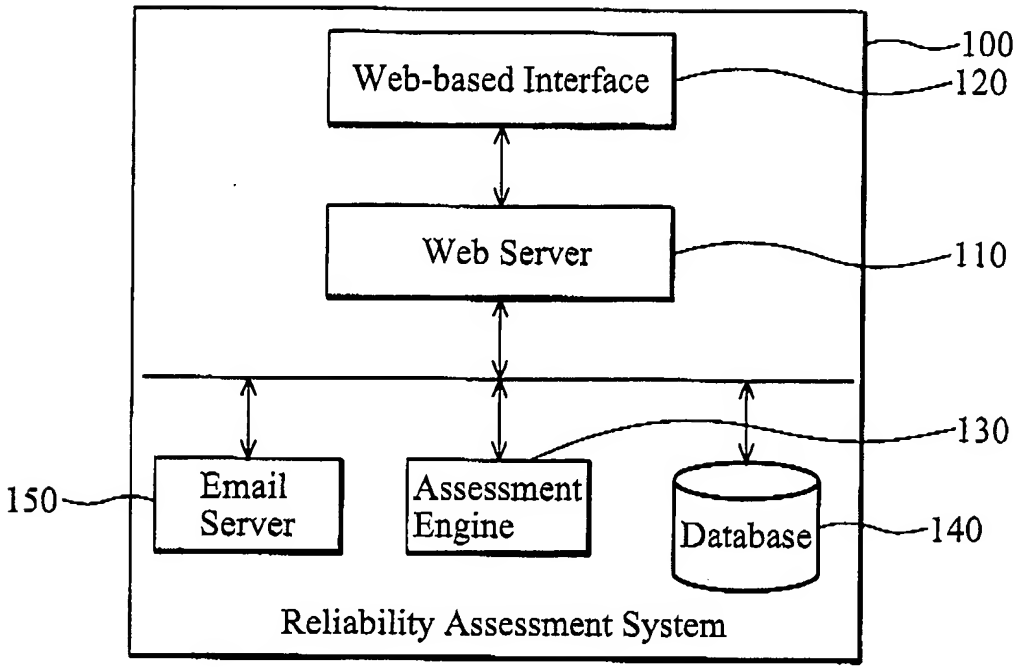
Web-based Interface
100
120
Web Server
110
130
150
Email Server
Assessment Engine
Database
140
Reliability Assessment System

FIG. 3

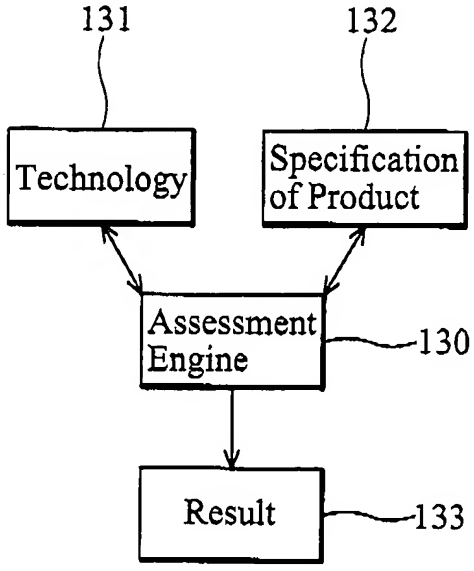
131
132
Technology
Specification of Product
Assessment Engine
130
Result
133

FIG. 4

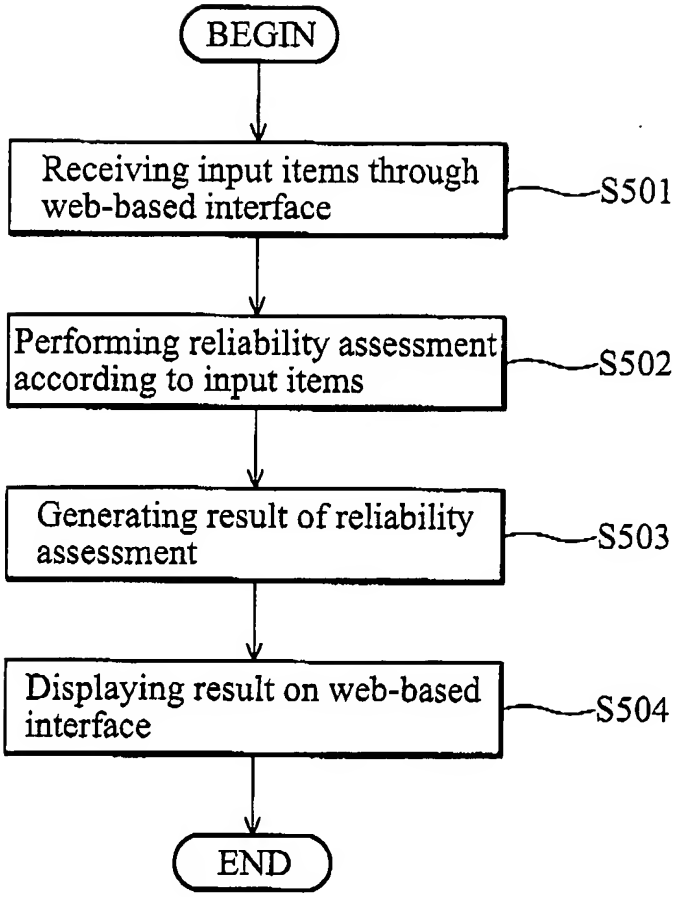
BEGIN
Receiving input items through web-based interface
S501
Performing reliability assessment according to input items
S502
Generating result of reliability assessment
S503
Displaying result on web-based interface
S504
END

FIG. 5

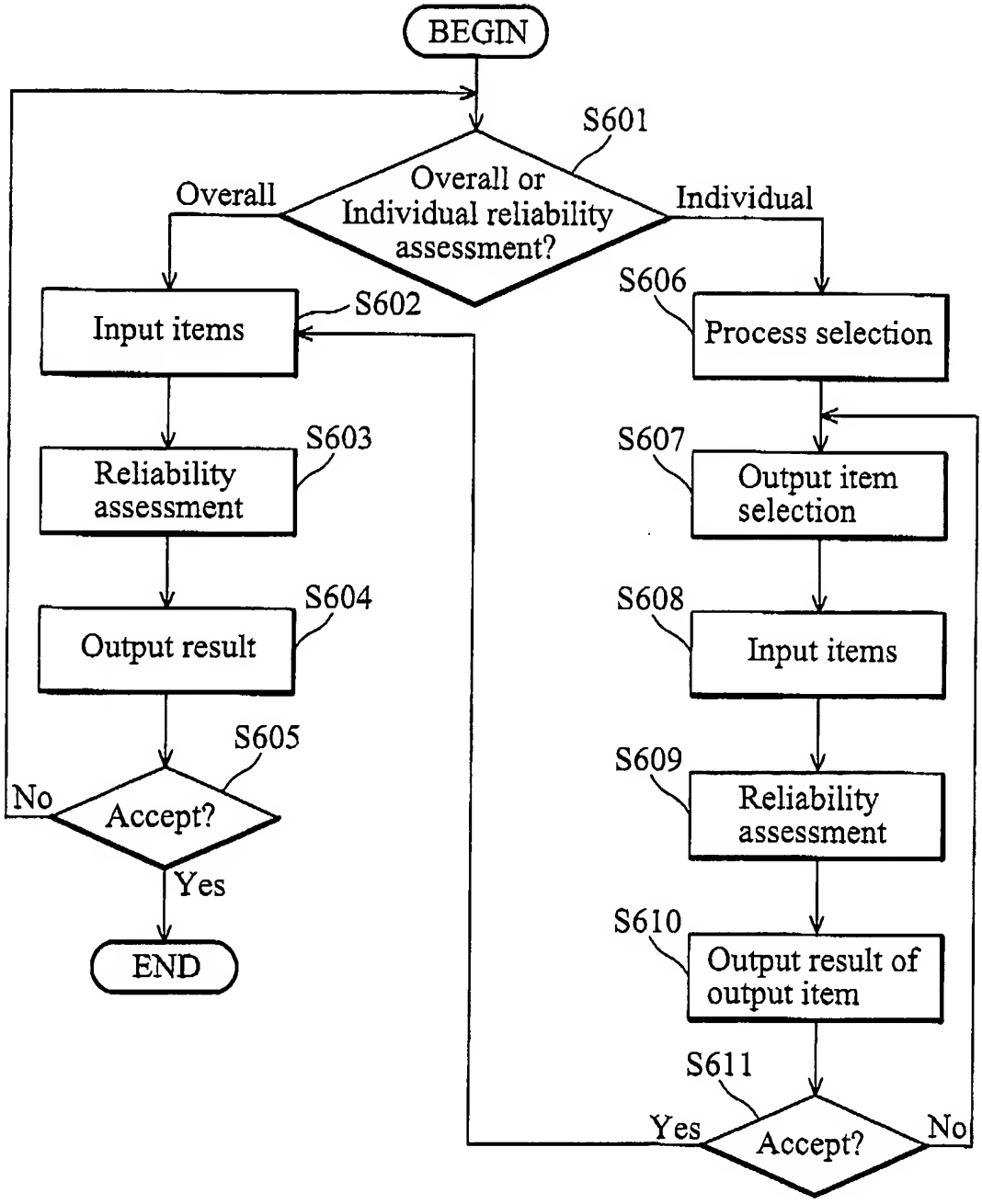
BEGIN
S601
Overall or Individual reliability assessment?
Overall
Individual
Input items
S602
Reliability assessment
S603
Output result
S604
S605
No
Accept?
Yes
END
S606
Process selection
S607
Output item selection
S608
Input items
S609
Reliability assessment
S610
Output result of output item
S611
Yes
Accept?
No

FIG. 6

| Items | Input |
|---|---|
| *Generation | [ v ] 0.13um, [ ] 90nm |
| | [ ] CL013G (1.2V/3.3V) FSG, [ ] CL013LV (1.0V/3.3V) FSG,<br>[ ] CL013G (1.2V/3.3V) LK, [ v ] CL013LV (1.0V/3.3V) LK |
| *Process | [ 1 ] Poly [ 8 ] Metal |
| *Vcc | core [ 1.0 ] V, I/O [ 3.3 ] V |
| | |
| *Tj max | [ 85 ] C |
| | tolerance [ nnn ] C |
| *Gate oxide area<br>(in total product) | core NMOS [ 2E6 ] um^2, core PMOS [ 2E6 ] um^2<br>I/O NMOS [ 2E6 ] um^2, I/O PMOS [ 2E6 ] um^2 |
| Transistor size | core NMOS: W/L=[ 10 ] / [ 0.13 ] um<br>core PMOS: W/L=[ 10 ] / [ 0.13 ] um<br>I/O NMOS: W/L=[ 10 ] / [ 0.35 ] um<br>I/O PMOS: W/L=[ 10 ] / [ 0.3 ] um |
| Metal dimension | metal-1 : spacing/length = [ 0.18 ] / [ ooo ] um<br>inter-metal (M2~M7): spacing/length = [ 0.21 ] / [ ppp ] um<br>top metal (M8): spacing/length = [ 0.46 ] / [ qqq ] um |
| *Use TSMC EM Jmax design rule | [ 100% ] |
| Product lifetime | [ 10 ] years |
| Product burn-in | [ NO ], If "YES", then Vcc = [ ]V with duration [ ] hrs |
| Product die size | X = [ xxx ] mm, Y= [ yyy ] mm (no including scribe line and seal ring) |
| Emb-SRAM size/area | [ aaa ] Mbits with area [ bbb ] mm^2 |
| EFR expection | [ 500 ] DPM with duration [ 30 ] days |
| Excute | |

700

FIG. 7

800

| Customer: | MEI | User: | Tony_Lee | Sheet no. 00001 | |
|---|---|---|---|---|---|
| | Items | Device | Dimension | Decision | Result |
| Process Reliability | GOI | core NMOS | 2E6 um^2 | pass | 100 yrs |
| | | core PMOS | 2E6 um^2 | pass | 80 yrs |
| | | I/O NMOS | 2E6 um^2 | pass | 30 yrs |
| | | I/O PMOS | 2E6 um^2 | pass | 30 yrs |
| | HCI | core NMOS | 10/0.13 | pass | 1000 yrs |
| | | core PMOS | 10/0.13 | pass | 1325 yrs |
| | | I/O NMOS | 10/0.35 | fail | 0.12 yrs |
| | | I/O PMOS | 10/0.3 | pass | 5 yrs |
| | NBTI | core PMOS | 10/0.13 | pass | 6 yrs |
| | | I/O PMOS | 10/0.3 | pass | 7 yrs |
| | EM | metal line | | pass | 10 yrs |
| | | contact/via hole | | pass | 10 yrs |
| | | bump | | pass | 10 yrs |
| | LK IMD TDDB | IMD | | pass | 12 yrs |
| Process Reliability | EFR | 30 days | | --- | 500 DPM |
| | LTFA | 0-1 year | | --- | 200 FITs |
| | | 1-10 years | | --- | 800 FITs |
| | | | | | |

810

Fig. 8A Fig. 8B

FIG. 8A

| Date:July 1,2003 |
| --- |
| Criterion |
| 0.1% cum. fail, DC>=10 years |
| delta Idsh>=2.5%, 0.1% cum. fail, DC>=0.2 years |
| delta Idsat>=10%, 0.1% cum. fail, DC>=0.2 years |
| delta Idsat >=10%, 0.1% cum. fail, DC >=5 years |
| delta R <= 10%, DC > 10 years |
| 0.1% cum. fail, DC >= 10 years |
| ---------- |
| ---------- |
| ---------- |
| |

FIG. 8B

| Items | Input | output |
|---|---|---|
| Generation | [ v ] 0.13um, [ ] 90nm | 0.13um |
| Process | [ v ] 1.2V/3.3V FSG, [ ] 1.0V/3.3V FSG,<br>[ ] 1.2V/3.3V LK, [ ] 1.0V/3.3V LK | 1.2V/3.3V FSG |
| Choose output item | [ ] DC lifetime [ ] transistor size<br>[ ] cum. fail [ ] Tj max [ v ] Vcc | Vcc |
| Vcc | core [ ] V, I/O [ ] V | core <= 1.2 V, I/O <= 3.5 V |
| | tolerance [ 0.1 ] V | |
| Tj max | [ 85 ] C | 85 C |
| | tolerance [ nnn ] C | |
| Transistor size | core NMOS : W/L=[ 10 ] / [ 0.13 ] um<br>core PMOS : W/L=[ 10 ] / [ 0.13 ] um<br>I/O NMOS : W/L=[ 10 ] / [ 0.35 ] um<br>I/O PMOS : W/L=[ 10 ] / [ 0.30 ] um | core NMOS : W/L=10/0.13 um<br>core PMOS : W/L=10/0.13 um<br>I/O NMOS : W/L=10/0.35 um<br>I/O PMOS : W/L=10/0.30 um |
| Fail criterion | [ v ] Idsat with [ 10 ] % degradation<br>(Vs=Vb=GND, Vd=Vg=Vcc)<br>[ ] Idlin with [ ] % degradation<br>(Vs=Vb=GND, Vd=0.1V, Vg=Vcc)<br>[ ] gm with [ ] % degradation<br>(Vs=Vb=GND, Vd=0.1V, sweep Vg)<br>[ ] Vt with [ ] % degradation<br>(Vs=Vb=GND, Vd=0.1V, sweep Vg) | delta Idsat >= 10% |
| cum fail (%) | [ 0.1 ] % | 0.1% |
| DC lifetime | [ 0.2 ] years | 0.2 years |
| DC to AC factor | [ 50 ] or<br>[ ] (please provide wave form excel file) | DC to AC factor = 50 |
| Excute | | |

910

900

FIG. 9

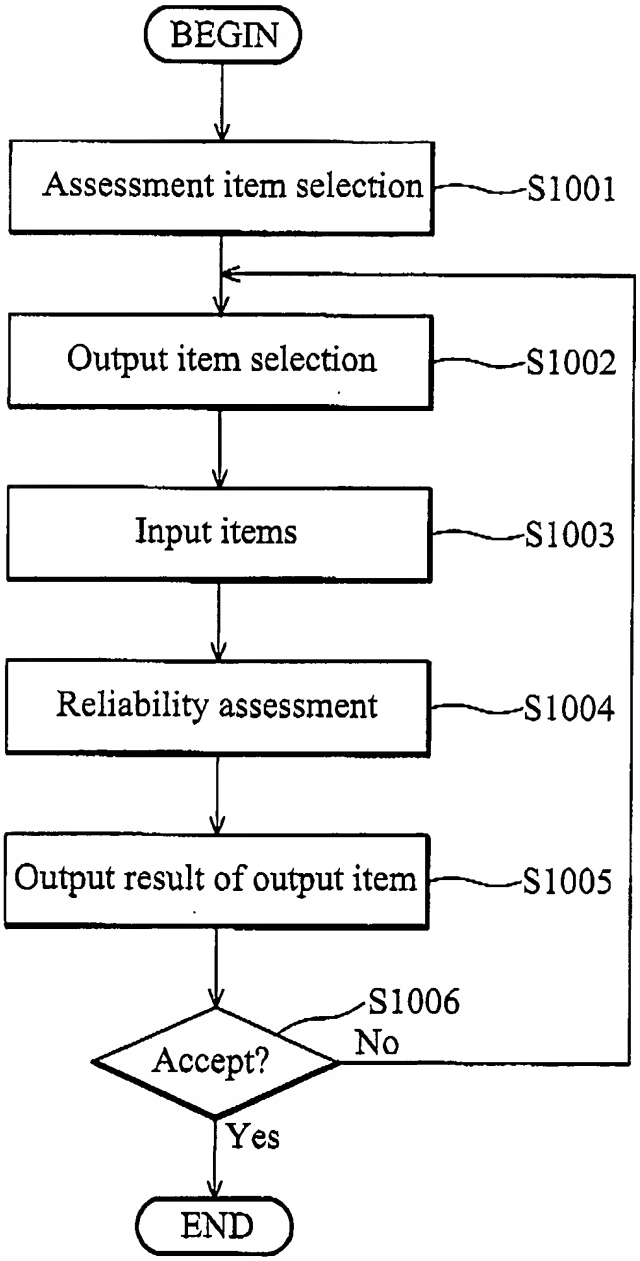
BEGIN
Assessment item selection
S1001
Output item selection
S1002
Input items
S1003
Reliability assessment
S1004
Output result of output item
S1005
S1006
Accept?
No
Yes
END

FIG. 10

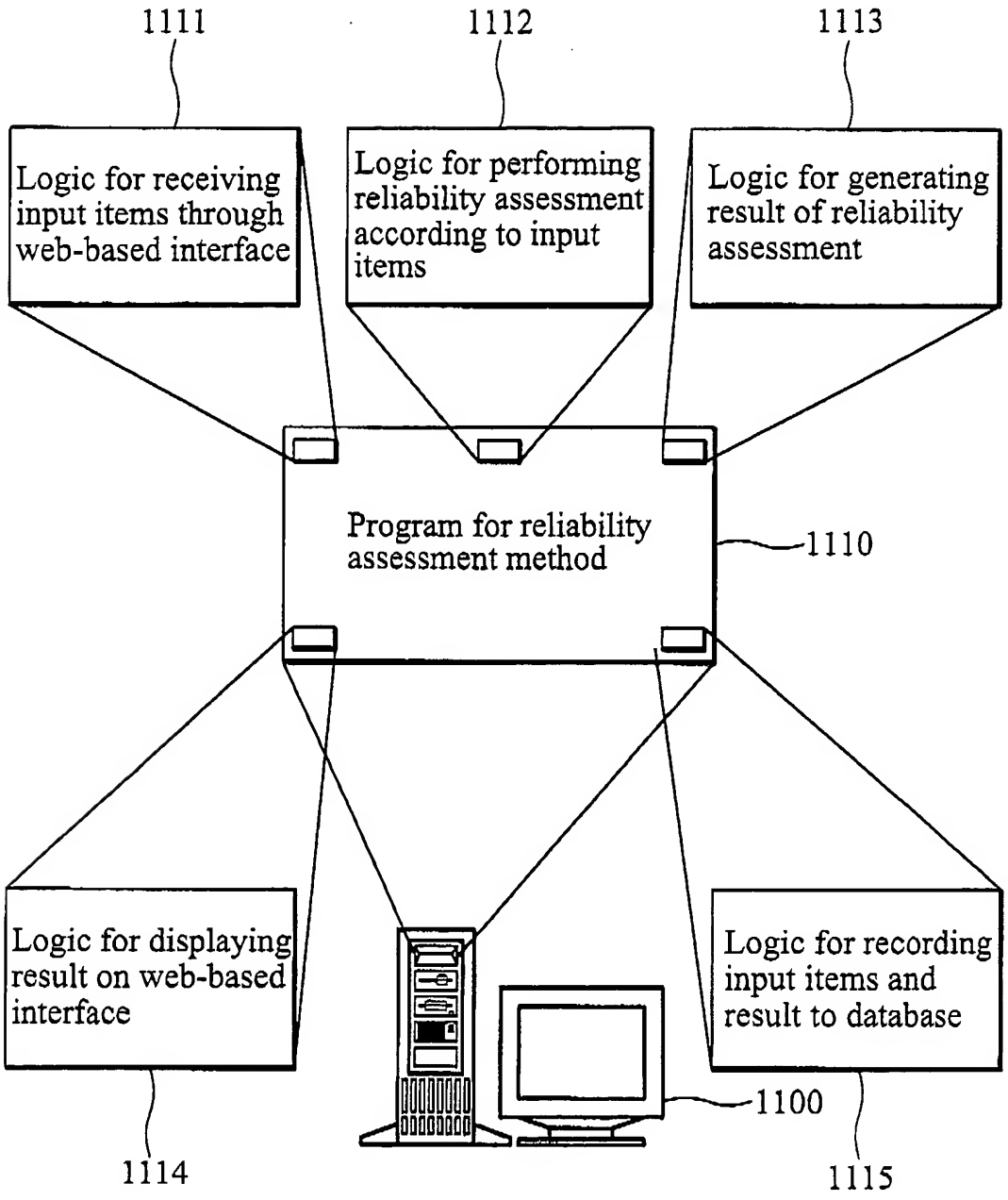
1111
1112
1113
Logic for receiving input items through web-based interface
Logic for performing reliability assessment according to input items
Logic for generating result of reliability assessment
Program for reliability assessment method
1110
Logic for displaying result on web-based interface
Logic for recording input items and result to database
1100
1114
1115

FIG. 11